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EXAMINER
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VO, DON NGUYEN

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* GIOVANNI DI BERNARDO, MARCO BRANCIFORTE,  
MARINELLA MILAZZO, and LUIGI OCCHIPINTI  
Applicants

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Appeal 2007-3319  
Application 09/747,786  
Technology Center 2600

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Decided: January 23, 2008

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Before JAMESON LEE, RICHARD TORCZON, and SALLY C.  
MEDLEY, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*.

DECISION ON APPEAL

1A. Statement of the Case

2 This is a decision on appeal by the Applicants under 35 U.S.C.  
3 § 134(a) from a final rejection of claims 9-32. We have jurisdiction under 35  
4 U.S.C. § 6(b).

4

1       References Relied on by the Examiner

2

3Brenman	US 4,590,942	May 27, 1986
4Cutler	US 5,847,960	Dec. 8, 1998
5Abarbanel	US 5,923,760	Jul. 13, 1999
6Giacomini	US 6,259,486	Jul. 10, 2001

7Applicants' Admitted Prior art

8

9Lee, Lee, and Williams, *Secure Communication Using Chaos*,  
10IEEE Global Telecommunications Conference; Globecom '95; 1183-1187  
11(1995) (hereinafter "Lee").

12

13                               The Rejections on Appeal

14

15       The Examiner rejected claims 9, 12, 25, and 28 under 35 U.S.C.

16§ 103(a) as unpatentable over Abarbanel and Lee.

17       The Examiner rejected claims 10, 11, 17-19, 26, and 27 under

1835 U.S.C. § 103(a) as unpatentable over Abarbanel, Lee, and Cutler.

19       The Examiner rejected claims 13 and 29 under 35 U.S.C. § 103(a) as

20unpatentable over Abarbanel, Lee, and Applicants' admitted prior art.

21       The Examiner rejected claims 14, 16, 21, 24, 30, and 32 under 35

22U.S.C. § 103 (a) as unpatentable over Abarbanel, Lee, Cutler, Brenman, and

23Giacomini.

24       The Examiner rejected claims 15, 22, 23, and 31 under 35 U.S.C.

25§ 103 (a) as unpatentable over Abarbanel, Lee, Cutler, Giacomini, Brenman,

26and Applicants' admitted prior art.

27       The Examiner rejected claim 20 under 35 U.S.C. § 103(a) as

28unpatentable over Abarbanel, Lee, Cutler, and Applicants' admitted prior

29art.

30

1B. Issues

2 Have the Applicants' shown error in the rejection of claims 9-32  
3under 35 U.S.C. § 103 as unpatentable over prior art.

4C. Summary of the Decision

5 The Applicants' have not shown error in the rejection of any claim  
6under 35 U.S.C. § 103 as unpatentable over prior art.

7D Findings of Fact (Referenced as FF. ¶ No.)

8 1. The Applicants disclose an invention directed to a  
9communication system and method for making signal transmissions. The  
10invention is based on chaotic modulation and uses an incoherent  
11discriminator in the receiver. (Spec. 6:7-25).

12 2. The independent claims are claims 9, 17, 21, and 25. Claims 9,  
1317, and 21 are apparatus claims and claim 25 is a method claim.

14 3. Claims 9 and 25 are reproduced below:

15 Claim 9. A communication system comprising:

16

17 a transmission channel;

18

19 a signal source for providing a discrete signal;

20

21 a chaotic modulator for modulating the discrete signal for  
22 transmitting over said transmission channel; and

23

24 an incoherent discriminator for receiving the modulated  
25 discrete signal from said transmission channel.

26

27 Claim 25. A method for transmitting a signal over a  
28 transmission channel, the method comprising:

29

30 generating a discrete signal;

31

1           modulating the discrete signal using a chaotic modulator  
2       for transmitting over the transmission channel; and  
3  
4       receiving the modulated discrete signal from the transmission  
5channel using an incoherent discriminator.  
6

7       4.     The Examiner determined that Abarbanel discloses a  
8communication system including a signal source providing a discrete signal,  
9a chaotic modulator to modulate the discrete signal, and a transmission  
10channel, as are recited in claim 9 (Ans. 3:12-20). That finding is not  
11challenged by the Applicants.

12       5.     The Examiner also determined that Abarbanel does not  
13disclose an incoherent discriminator in a receiver for receiving the  
14modulated discrete signal from the transmission channel.

15       6.     Abarbanel discloses a communication system in which the  
16bandpass filter network in the chaotic signal modulator within the  
17transmitter is made to be the same as that in the chaotic signal demodulator  
18within the receiver. (Abarbanel 2:42-56). The receiver structure “mirrors”  
19that of the transmitter. (Abarbanel 3:6-7). The receiver chaotic generator is  
20substantially identical to the transmitter chaotic signal generator.  
21(Abarbanel Abstract: 13-15).

22       7.     Abarbanel discloses that the identical bandpass filter network in  
23its transmitter and receiver structures leads to synchronization which allows  
24demodulation and recovery of the original transmitted signal. (Abarbanel  
25Summary: 22-27).

26       8.     Lee discloses a communication scheme using a chaotic  
27system which requires no synchronization of the receiver to the  
28transmitter to achieve robust communication. (Lee Abstract).

1        9.     Lee discloses determining which data stream comes from  
2its particular system by comparing the power level of the dynamical  
3error of each data stream. (Lee Abstract: 11-16).

4        10.    The Examiner found Lee's disclosure of comparing the  
5power level of the dynamical error of each data stream as setting forth  
6the use of an incoherent discriminator in the receiver. (Ans. 4:3-14;  
718:15-17). That position is not challenged by the Applicants.

8        11.    Lee states that the advantages of its disclosed system is  
9that it requires no synchronization of the transmitter and receiver.  
10(Lee Abstract: 13-15).

11

12E.     Principles of Law

13        Obviousness is a legal determination made on the basis of underlying  
14factual inquiries including (1) the scope and content of the prior art; (2) the  
15differences between the claimed invention and the prior art; (3) the level of  
16ordinary skill in the art; and (4) any objective evidence of unobviousness,  
17*Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). One with ordinary skill  
18in the art is presumed to have skills apart from what the prior art references  
19explicitly say. *See In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985). A  
20person of ordinary skill in the art is also a person of ordinary creativity, not  
21an automaton. *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742  
22(2007).

23        In *KSR International Co.*, 127 S. Ct. at 1742, with regard to  
24motivation to combine teachings, the Supreme Court stated: "Rigid  
25preventive rules that deny factfinders recourse to common sense, however,  
26are neither necessary under our case law nor consistent with it."

2Also, motivation to combine teachings need not be expressly stated in any  
3prior art reference. *In re Kahn*, 441 F.3d 977, 989 (Fed. Cir. 2006). There  
4need only be an articulated reasoning with rational underpinnings to support  
5a motivation to combine teachings. *In re Kahn*, 441 F.3d at 988.

6       The test for determining obviousness is not whether the features of  
7one reference may be bodily incorporated into the system disclosed in  
8another reference, but whether the collective teachings as viewed by one  
9with ordinary skill in the art would have rendered the claimed subject matter  
10obvious. *In re Wood*, 559 F.2d 1032, 1036 (CCPA 1979). A prior art  
11reference must be considered for everything it teaches by way of technology  
12and is not limited to the particular invention it is describing and attempting  
13to protect. *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed.  
14Cir.), *cert. denied*, 474 U.S. 843 (1985). A reference must be evaluated for  
15all its teachings and is not limited to its specific embodiments. *In re Bode*,  
16550 F.2d 656, 661 (CCPA 1977).

17F.     Analysis

18       As in any appeal, the Applicants as appellant bear the burden of proof  
19in demonstrating error in the rejections on appeal.

20       All three independent apparatus claims 9, 17, and 21 require a chaotic  
21modulator for modulating a digital signal for transmission and an incoherent  
22discriminator for receiving the modulated signal. Independent method claim  
2325 requires a step of modulating a discrete signal for transmission using a  
24chaotic modulator, and a step of receiving the modulated signal using an  
25incoherent discriminator. Thus, a chaotic modulator for transmitting a signal

1and an incoherent discriminator for receiving a signal are common to all of  
2the Applicants' claims on appeal.

3       The Applicants do not argue the merits of any claim separately.  
4Rather, for each rejection on appeal, all of the Applicants' arguments are  
5based on the two common features of a chaotic modulator for modulating a  
6discrete signal for transmission and an incoherent discriminator for receiving  
7the modulated and transmitted signal. In all of the rejections on appeal, the  
8Examiner relied on prior art references Abarbanel and Lee to account for  
9those features. Accordingly, we will specifically discuss only the rejection  
10of claim 9 as unpatentable over Abarbanel and Lee, which is representative.  
11The rejection of all other claims stand and fall with the rejection of claim 9.

12       As for claim 9, Applicants do not dispute the Examiner's finding that  
13Abarbanel discloses all elements of the claim except an incoherent  
14discriminator for receiving the modulated signal from a transmission  
15channel. For that feature, the Examiner relied on Lee. In pertinent part  
16(Ans. at 4), the Examiner stated:

17               Lee discloses a secure communications scheme using a  
18       chaotic communications system. Lee also discloses  
19       determining the data stream by comparing the power level of  
20       the dynamical error of each data stream (Page 1183 Abstract,  
21       ll. 2-17 & Page 1187, Fig. 2-3). Lee further discloses that the  
22       advantage of comparing the level to determine the received  
23       signal is that it does not require the synchronization of the  
24       receiver to the transmitter (Page 1183, Abstract, lines 8-17 &  
25       Page 1184, left-hand column, ll. 1-11). Therefore, it would  
26       have been obvious to one of ordinary skill in the art at the time  
27       of the invention that Lee teaches implementing a chaos  
28       modulator and an incoherent receiver to receive the transmitted  
29       signal and this can be implemented in the chaotic  
30       communication system as described in Abarbanel so as to  
31       provide a receiver so as to minimize the effect of the initial



1 conditions and synchronization errors in the demodulation of  
2 the signal received at low SNR.

3  
4 The Applicants do not challenge the Examiner's finding that Lee  
5discloses use of an incoherent discriminator in the receiving portion of the  
6communication system, as represented by that which determines the data  
7stream by comparing the power level of the dynamical error of each data  
8stream. Instead, the Applicants argue that one with ordinary skill would not  
9have had motivation or suggestion to combine the teachings of Abarbanel  
10and Lee as the Examiner has proposed, because the prior art allegedly  
11teaches away from making that combination (Br. 4:18-24).

12 The argument is unpersuasive.

13 The Applicants correctly state that the use of an incoherent  
14discriminator in accordance with the present invention advantageously  
15allows the discrete signal to be reconstructed using a structure that is  
16different from the structure used to modulate the discrete signal for  
17transmission. The Applicants also correctly state that in the communication  
18system disclosed in Abarbanel, there is a chaotic signal generator 30 in the  
19transmitter and a chaotic signal generator 30 in the receiver (Br. 5:4-9), and  
20that because the structure of these two chaotic signal generators are  
21identical, Abarbanel's system achieves auto-synchronization (Br. 6:1-5).

22 Thereafter, however, the Applicants reasoning goes awry, based on an  
23unduly restrictive and overly rigid view of a reading of the prior art. The  
24misplaced portions of the Applicants argument and reasoning are this:

25 (1) Because Abarbanel does not include or need an incoherent  
26discriminator since its transmitted signals are auto-synchronized due to the  
27use of substantially identical structures in the transmitter and receiver, the

1system of Abarbanel “teaches away” from the use of an incoherent  
2discriminator for receiving the transmitted signal (Br. 6:22-29); and

3 (2) Nothing in Lee suggests the desirability of using an incoherent  
4discriminator within an auto-synchronizing mirrored system such as that  
5disclosed in Abarbanel, because Lee is concerned with synchronizing two  
6“arbitrary” or “different” chaotic systems (Br. 7:2-7).

7 The test for determining obviousness is not whether the features of  
8one reference may be bodily incorporated into the system disclosed in  
9another reference, but whether the collective teachings as viewed by one  
10with ordinary skill in the art would have rendered the claimed subject matter  
11obvious. *In re Wood*, 559 F.2d at 1036. Abarbanel also does not teach away  
12from Applicants’ invention simply because it discloses a different solution,  
13i.e., using identical structures in the transmitter and receiver to achieve auto-  
14synchronization. The Applicants point to nothing in Abarbanel which  
15indicates that use of an incoherent discriminator in a receiver, together with  
16a chaotic signal generator in the transmitter, would not achieve robust  
17communication.

18 A prior art reference must be considered for everything it teaches by  
19way of technology and is not limited to the particular invention it is  
20describing and attempting to protect. *EWP Corp. v. Reliance Universal Inc.*,  
21755 F.2d at 907. A reference must be evaluated for all its teachings and is  
22not limited to its specific embodiments. *In re Bode*, 550 F.2d at 661. It is  
23unduly restrictive for the Applicants to preclude any and all reliance on the  
24Abarbanel reference unless its teaching of using the same structure in the  
25transmitter and receiver is adopted lock, stock, and barrel. Abarbanel  
26nowhere discloses to one with ordinary skill in the art that there cannot be

1any way to achieve robust communication except by employing identical  
2filter structures in the transmitter and receiver.

3        Lee discloses another way to achieve robust communication, and  
4Lee's way does not require synchronization or the use of identical structures  
5in the transmitter and receiver. It is stated (Lee 1184:1-5): "This scheme  
6does not require synchronization, since it tries to extract information from  
7each data stream itself rather than relying on the received sequence to drive  
8the receiver toward synchronization." As the Applicants themselves have  
9recognized (Br. 7:5-7), Lee's use of an incoherent discriminator in the  
10receiver has application when different chaotic system structures are used in  
11the transmitter and receiver.

12        The teachings of Abarbanel and Lee are not "disjointed," as the  
13Applicants allege. To the contrary, the Examiner's rationale is sound and  
14logical. Both Abarbanel and Lee disclose a communication system using a  
15chaotic modulator in the transmitter for providing a discrete signal for  
16transmission to a receiver. As is explained by the Examiner, both references  
17disclose a chaotic communication system using a chaotic modulator and  
18demodulator. (Ans. 19:19-21). While Abarbanel teaches using identical  
19structures in the transmitter and receiver to achieve robust communication  
20through auto-synchronization, Lee discloses using an incoherent  
21discriminator in the receiver to achieve robust communication without need  
22for synchronization or identical structures in the transmitter and receiver.  
23One with ordinary skill in the art, who presumably is skilled and not an  
24automaton, would recognize from Lee's disclosure that the communication  
25system of Abarbanel would also work without auto-synchronization, so long

1as an incoherent discriminator is used in the receiver. Lee's teaching  
2complements that of Abarbanel.

3       The Applicants approach to reading Abarbanel is excessively rigid  
4and unduly restricts the teaching value of Abarbanel as a prior art reference.  
5Although Abarbanel's invention is directed to achieving synchronization,  
6that does not mean all of its general components, such as the signal source,  
7the chaotic modulator and the transmission channel, may not be used in any  
8modified system in which auto-synchronization through having mirrored  
9structures in the transmitter and receiver is not implemented. As was  
10explained by the Examiner (Ans. 18:19-22):

11       Lee further discloses that the advantage of the comparing the  
12       level to determine the received signal [as opposed to relying on  
13       synchronization] is that it does not require the synchronization  
14       of the receiver to the transmitter or knowledge of the  
15       transmitter. (Emphasis added.)  
16

17The Examiner further explained that that the motivation for doing as Lee  
18discloses, but in Abarbanel, is also to minimize the effect of initial  
19conditions and errors arising from synchronization (Ans. 20:10-13). The  
20reasoning is sound and logical. Motivation to combine teachings need not  
21be expressly stated in any prior art reference. *In re Kahn*, 441 F.3d at 989  
22(Fed. Cir. 2006). There need only be an articulated reasoning with rational  
23underpinnings to support a motivation to combine teachings. *In re Kahn*,  
24441 F.3d at 988. Here, there not only is rational reasoning from the  
25Examiner, but also express teaching from Lee that synchronization is not  
26required if one would use an incoherent discriminator in the receiver. The  
27Applicants do not establish why the Examiner's reasoning is wrong that in  
28light of Lee's teaching, one with ordinary skill in the art, who is skilled and

1possesses common sense and ordinary creativity, would know to adopt  
2Abarbanel's system but change it to not have identical filter structures in the  
3transmitter and receiver but an incoherent discriminator in the receiver.

4 For all of the foregoing reasons, the Applicants have failed to  
5demonstrate error in the rejection of claims 9-32.

6G. Conclusion

7 The rejection of claims 9, 12, 25, and 28 under 35 U.S.C.  
8§ 103(a) as unpatentable over Abarbanel and Lee is **affirmed**.

9 The rejection of claims 10, 11, 17-19, 26, and 27 under  
1035 U.S.C. § 103(a) as unpatentable over Abarbanel, Lee, and Cutler is  
11**affirmed**.

12 The rejection of claims 13 and 29 under 35 U.S.C. § 103(a) as  
13unpatentable over Abarbanel, Lee, and Applicants' admitted prior art is  
14**affirmed**.

15 The rejection of claims 14, 16, 21, 24, 30, and 32 under 35 U.S.C.  
16§ 103 (a) as unpatentable over Abarbanel, Lee, Cutler, Brenman and  
17Giacomini is **affirmed**.

18 The rejection of claims 15, 22, 23, and 31 under 35 U.S.C.  
19§ 103 (a) as unpatentable over Abarbanel, Lee, Cutler, Giacomini, Brenman,  
20and Applicants' admitted prior art is **affirmed**.

21 The rejection of claim 20 under 35 U.S.C. § 103(a) as unpatentable  
22over Abarbanel, Lee, Cutler, and Applicants' admitted prior art is **affirmed**.

23 No time period for taking any subsequent action in connection with  
24this appeal may be extended under 37 C.F.R. § 1.136(a).

25

**AFFIRMED**

46Appeal 2007-3319  
47Application 09/747,786  
48

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